

ABSTRACT OF THE DISCLOSURE

A system and method for determining the desired decoupling components for a power distribution system having a voltage regulator module. The system may employ a mathematical model of a voltage regulator circuit, such as a switching voltage regulator. The mathematical model may be a SPICE model, or a circuit model in another format. The method may include simulating the operation of the power distribution system to obtain a estimate of the bulk capacitance required for effective decoupling. For digital systems, the method may include a cycle-by-cycle simulation of the power distribution system, wherein the simulation occurs over a number of clock cycles. The performance of the power distribution system may then be analyzed for each simulated clock cycle. The simulation may also include analyzing the transient responses and loop stability of the power distribution. Based on the results of these various simulations, the bulk capacitance value may be refined, thus allowing the system to begin the selection of specific decoupling components from the database in order to satisfy the bulk capacitance requirements.